FACT SHEET AND SUPPLEMENTAL INFORMATION FOR THE PROPOSED MODIFICATION OF THE WESTERN GULF OF MEXICO OCS GENERAL PERMIT

(Permit No. GMG290000)

April 19, 1999

U.S. Environmental Protection Agency
Region 6
1445 Ross Ave.
Dallas, TX 75202

Proposed Modification of the NPDES General Permit
for the Western Portion of the
Outer Continental Shelf (OCS) of the Gulf of Mexico
(GMG290000)

AGENCY: Environmental Protection Agency
ACTION: Notice of Proposed NPDES General Permit Modification

SUMMARY: The Regional Administrator of Region 6 today proposes to modify the National Pollutant Discharge Elimination System (NPDES) general permit for the Western Portion of the Outer Continental Shelf of the Gulf of Mexico (No. GMG290000) for discharges from existing and new dischargers and New Sources in the Offshore Subcategory of the Oil and Gas Extraction Point Source Category (40 CFR Part 435, Subpart A). The expired permit, published at 61 FR 41609 on August 9, 1996 was reissued in part and was published at 63 FR 58722 on November 2, 1998. The remainder of the permit is being reissued and is published in the Federal Register along with this modification proposal. The permit authorizes discharges from exploration, development, and production facilities located in and discharging to Federal waters of the Gulf of Mexico seaward of the outer boundary of the territorial seas off Louisiana and Texas. The permit also allows discharges of produced water to Federal Waters from facilities located in the territorial seas. Through this permit modification EPA proposes to add to the permit authorization to discharge drill cuttings produced using synthetic-based and other non-aqueous drilling fluids. Additionally, the Agency is requesting information on new discharges of water used to pressure test existing piping and existing pipelines which are being considered.

Only the proposed modification to the permit is being opened for comment.

ADDRESS: Comments should be sent to:
Regional Administrator Region 6, U.S. Environmental Protection Agency, 1445 Ross Avenue, Dallas, Texas 75202-2733.

DATE: Comments must be received by [60 days after publication].

FOR FURTHER INFORMATION CONTACT: Ms. Wilma Turner (6WQ-O), Region 6, U.S. Environmental Protection Agency, 1445 Ross Avenue, Dallas, Texas 75202-2733. Telephone: (214) 665-7516.

FACT SHEET AND SUPPLEMENTAL INFORMATION

Table of Contents

I. Introduction

The National Pollutant Discharge Elimination System (NPDES) general permit for the Western Portion of the Outer Continental Shelf of the Gulf of Mexico (No. GMG290000), hereafter referred to as the "OCS general permit" is proposed to be modified to authorize the new discharge of drill cuttings which are produced using synthetic-based and other non-aqueous drilling fluids. The existing general permit for this area, which covers existing dischargers, new dischargers, and New Sources is published in the Federal Register along with the public notice of this permit modification. Water-based drilling fluids, and the cuttings produced using them, are presently authorized to be discharged under the OCS general permit, and the limitations and monitoring requirements pertaining to those discharges are not proposed to be changed. Likewise, the existing permit's discharge prohibitions for oil-based and mineral oil-based drilling fluids and cuttings generated using those drilling fluids are not proposed to be modified.

The OCS general permit authorizes discharges from exploration, development and production facilities which are located in and discharging to Federal waters of the Gulf of Mexico, seaward of the outer boundary of the territorial seas of Louisiana and Texas and produced water discharges to those waters from facilities located in the territorial seas. The outer boundary of the territorial seas is the seaward line marking three nautical miles from the baseline of each state. The territory covered by the permit is based on the Clean Water Act (CWA), not mineral ownership. Hence, operators under some mineral leases granted by the State of Texas (which claims mineral ownership to three marine leagues from shore) must still seek coverage under this permit.

Operators who submitted notices of intent to be covered by the Western Gulf of Mexico OCS general permit (GMG290000) need not resubmit notices of intent to be coverage under this permit modification.

II. Types of Drilling Fluids

In response to its performance needs and regulatory requirements, the oil and gas extraction industry has developed new synthetic based drilling fluids (SBF's). The new drilling fluids are used in cases, such as deep water or directional drilling, where use of water based fluids is not practical and traditionally oil based drilling fluids would have been used. Discharge of oil-based drilling fluids and the associated cuttings is prohibited; therefore, they are expensive to use due to the costs of hauling them to shore and disposing of them in oilfield waste disposal facilities.

The base material which makes SBF's can be any number of synthetic oleaginous materials such as: vegetable esters, poly alpha olefins, internal olefins, synthetic paraffins, and others. The industry has also developed other oleaginous materials for use as the base for drilling fluids such as enhanced mineral oils and non-synthetic paraffins. All of these were developed to obtain

similar performance to traditional oil-based drilling fluids.

III. Technology Based Limitations

As described in the proposed effluent limitations guidelines (64 FR 5487, February 3, 1999), the existing permit's monitoring methods are not adequate measures for discharges of Synthetic-Based Drilling Fluids. Since Water-Based Drilling Fluids disperse in seawater, the static sheen test method is an adequate measure of oil contamination. However, Synthetic-Based Drilling Fluids tend to sink as a mass and do not disperse in seawater. Because of that characteristic, oil contamination of SBFs has been shown to be less detectable with the static sheen test method than oil contamination of water-based drilling fluids. Likewise, the Suspended Particulate Phase toxicity test does not adequately measure the toxicity of SBFs because they do not disperse very well in the water column.

Bulk discharges of SBFs are not proposed to be authorized by the permit. Only the discharge of drill cuttings contaminated with Synthetic-Based Drilling Fluids is proposed to be authorized by this permit modification. Due to the high cost of Synthetic-Based Drilling Fluids, the normal industry practice has been to haul them to shore to be refined and then reused. Authorization to dispose of SBFs through discharge is not consistent with current industry practices and has not been requested by the industry. The limitations and conditions proposed to be added to the permit with this modification are based on recently proposed effluent limitations guidelines (see 64 FR 5487, February 3, 1999). A more detailed rationale of how the proposed limitations were derived can be found in the Federal Register notice for the guidelines and in the development document, economic analysis, and environmental assessment referenced in that proposal.

A. New Definitions

The following new definitions from the proposed effluent limitations guidelines are proposed to be added to the OCS general permit:

(a) Base fluid retained on cuttings means the American Petroleum Institute Recommended Practice 13B-2 supplemented with the specifications, sampling methods, and averaging of the retention values provided in Appendix 7 of 40 CFR Part 435, Subpart A.

(b) Biodegradation rate means the test procedure presented in Appendix 4 of 40 CFR Part 435, Subpart A.

(c) Percent degraded at 120 days means the concentration (milligrams/kilogram dry sediment) of the base fluid in sediment relative to the initial concentration of base fluid in sediment at the start of the test on day zero.

(d) Percent stock base fluid degraded at 120 days minus percent C16-C18 internal olefin degraded at 120 days shall not be less than zero means that the percent base fluid degraded at 120 days of any single sample of base fluid shall not be less than the percent C16-C18 internal olefin degraded at 120 days as a control standard

(e) Drill cuttings means the particles generated by drilling into subsurface geologic

formations and carried out from the wellbore with the drilling fluid.

(f) Drilling fluid Means the circulating fluid (mud) used in the rotary drilling of wells to clean and condition the hole and to counterbalance formation pressure. Classes of drilling fluids are:

(1) a water-based drilling fluid has water or a water miscible fluid as the continuous phase and the suspending medium for solids, whether or not oil is present.

(2) a non-aqueous drilling fluid is one in which the continuous phase is a water immiscible fluid such as an oleaginous material (e.g., mineral oil, enhanced mineral oil, paraffinic oil, or synthetic material such as olefins and vegetable esters).

(3) an oil-based drilling fluid has diesel oil, mineral oil, or some other oil, but neither a synthetic material nor enhanced mineral oil, as its continuous phase with water as the dispersed phase. Oil-based drilling fluids are a subset of non-aqueous drilling fluids.

(4) an enhanced mineral oil-based drilling fluid has an enhanced mineral oil as its continuous phase with water as the dispersed phase. Enhanced mineral oil-based drilling fluids are a subset of non-aqueous drilling fluids.

(5) a synthetic-based drilling fluid has a synthetic material as its continuous phase with water as the dispersed phase. Synthetic-based drilling fluids are a subset of non-aqueous drilling fluids.

(g) Enhanced mineral oil as applied to enhanced mineral oil-based drilling fluid means a petroleum distillate which has been highly purified and is distinguished from diesel oil and conventional mineral oil in having a lower polycyclic aromatic hydrocarbon (PAH) content. Typically, conventional mineral oils have a PAH content on the order of 0.35 weight percent expressed as phenanthrene, whereas enhanced mineral oils typically have a PAH content of 0.001 or lower weight percent PAH expressed as phenanthrene.

(h) No discharge of formation oil means that cuttings contaminated with non-aqueous drilling fluids (NAFs) may not be discharged if the NAFs contain formation oil, as determined by the GC/MS baseline method as defined in Appendix 5 to 40 CFR Part 435, Subpart A, to be applied before NAFs are shipped offshore for use, or the RPE method as defined in Appendix 6 to 40 CFR Part 435, Subpart A, to be applied at the point of discharge. At the discretion of the permittee, detection of formation oil by the RPE method may be assured by the GC/MS method, and the results of the GC/MS method shall supercede those of the RPE method.

(i) Maximum as applied to BAT effluent limitations and NSPS for drilling fluids and drill cuttings means the maximum concentration allowed as measured in any single sample of the barite for determination of cadmium and mercury content, or as measured in any single sample of base fluid for determination of PAH content.

(j) Maximum weighted average for well for BAT effluent limitations and NSPS for base fluid retained on cuttings means the weighted average base fluid retention as determined by API RP 13B-2, using the methods and averaging calculations presented in Appendix 7 of 40 CFR Part 435, Subpart A.

(k) Minimum as applied to BAT effluent limitations and NSPS for drilling fluids and drill cuttings means the minimum 96-hour LC50 value allowed as measured in any single sample of the discharged waste stream. The term minimum as applied to BPT and BCT effluent limitations and NSPS for sanitary wastes shall mean the minimum concentration value allowed as measured in any single sample of the discharged waste stream.

(l) Sediment toxicity as applied to BAT effluent limitations and NSPS for drilling fluids and drill cuttings means the ASTM E1367-92: Standard Guide for Conducting 10-day Static Sediment Toxicity Tests with Marine and Estuarine Amphipods (Available from the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA, 19428) supplemented with the sediment preparation procedure in Appendix 3 of 40 CFR Part 435, Subpart A.

(m) Synthetic material as applied to synthetic-based drilling fluid means material produced by the reaction of specific purified chemical feedstock, as opposed to the traditional base fluids such as diesel and mineral oil which are derived from crude oil solely through physical separation processes. Physical separation processes include fractionation and distillation and/or minor chemical reactions such as cracking and hydro processing. Since they are synthesized by the reaction of purified compounds, synthetic materials suitable for use in drilling fluids are typically free of polycyclic aromatic hydrocarbons (PAH's) but are sometimes found to contain levels of PAH up to 0.001 weight percent PAH expressed as phenanthrene. Poly(alpha olefins) and vegetable esters are two examples of synthetic materials suitable for use by the oil and gas extraction industry in formulating drilling fluids. Poly(alpha olefins) are synthesized from the polymerization (dimerization, trimerization, tetramerization, and higher oligomerization) of purified straight-chain hydrocarbons such as C6-C14 alpha olefins. Vegetable esters are synthesized from the acid-catalyzed esterification of vegetable fatty acids with various alcohols. The mention of these two branches of synthetic fluid base materials is to provide examples, and is not meant to exclude other synthetic materials that are either in current use or may be used in the future. A synthetic-based drilling fluid may include a combination of synthetic materials.

(n) 10-day LC50 means the concentration (milligrams/kilogram dry sediment) of the base fluid in sediment that is lethal to 50 percent of the test organisms exposed to that concentration of the base fluids after 10-days of constant exposure.

(o) 10-day LC50 of stock base fluid minus 10-day LC50 of C16-C18 internal olefin shall not be less than zero means that the 10-day LC50 of any single sample of the base fluid shall not be less than the LC50 of C16-C18 internal olefin as a control standard.

B. Application of Existing Limitations

The existing permit's prohibitions on the discharge of drill cuttings produced using drilling fluids with certain characteristics are proposed to apply to cuttings produced using non-aqueous drilling fluids. Those general prohibitions include: cuttings from oil-based drilling fluids, cuttings from

oil contaminated drilling fluids, and cuttings generated using drilling fluids which contain diesel oil, cuttings generated using mineral oil (except as a carrier fluids, lubricity additive, or pill). Also, the drill cuttings could not be discharged when the stock barite used in the drilling fluids exceeds the mercury limit of 1 mg/kg dry weight or the cadmium limit of 3 mg/kg dry weight. Drilling fluids must also contain no free oil, as measured by the static sheen test, for the discharge of drill cuttings to be authorized.

Limitations and prohibitions contained in the existing permit are not proposed to be changed as a part of this modification. They apply to all discharges of drill cuttings under the existing permit and are proposed to apply to cuttings generated using non-aqueous drilling fluids. To relax the requirements would be considered backsliding and is not allowed by the Clean Water Act. The proposed Effluent Limitations Guidelines for drill cuttings generated using non-aqueous drilling fluids include the same limitations and prohibitions for cadmium and mercury in stock barite, free oil, and diesel oil.

C. New Limitations Specific to Cuttings Generated Using Non-Aqueous Drilling Fluids

New limits from the proposed Effluent Limitations Guidelines for polynuclear aromatic hydrocarbons (PAH), sediment toxicity, biodegradation rate, and formation oil are proposed to be added to the OCS general permit based on BPJ. As described in the proposed guidelines, those limits and monitoring requirements are intended to make up for the deficiencies in the existing permit's static sheen test and suspended particulate phase toxicity test.

The PAH content is proposed to be limited to 10 ppm based on Phenanthrene in the stock base fluid. PAH was chosen as an indicator for diesel oil or mineral oil in drilling fluids. Oil based drilling fluids typically contain 5 to 10% PAH when diesel oil is used as the base fluid and 0.35% PAH when mineral oil is used. Synthetic based fluids generally do not contain PAHs.

A toxicity limit using a 10-day sediment toxicity test is proposed. The sediment toxicity test would be performed on the stock drilling fluid and natural sediment in accordance with ASTM E1367-92. The Leptocheirus plumulosus species is proposed to be used. Sampling will be required to be performed on a representative sample of stock drilling fluid before drilling each well. If additional wells are drilled at the site using the same stock drilling fluid, additional monitoring will not be required if new supplies of stock drilling fluids are not received at the site. The proposed monitoring regime is similar to that required in the existing permit for cadmium and mercury in stock barite.

The biodegradation rate is also proposed to be limited and monitored on the stock non-aqueous base fluid. As stated in the proposed effluent limitations guidelines, the biodegradation rate is a measure of the extent, in level and duration, of the toxic effect of toxic pollutants present in the base fluids. The test method, described in Appendix 1 of the proposed modification, is intended to compare the biodegradation rate of the stock base fluid with the biodegradation rate of internal olefin. Internal olefin was chosen as the benchmark because it degrades at a reasonable rate

relative to other non-aqueous base fluids and it meets the industry's performance needs in most situations. Like the sediment toxicity test, monitoring is only required to be performed once on the stock base fluid.

Formation oil contamination is proposed to be limited to no discharge. As with the no free oil limitation, this limit is intended to prevent the discharge of cuttings which are contaminated with crude oil. Compliance with this limit will be measured using Gas Chromatography/Mass Spectrometry (GCMS)(See Appendix 5, 64 FR 5487, February3, 1999) to measure the baseline for stock drilling fluids and a Reverse Phase Extraction method (See Appendix 6, 64 FR 5487, February 3, 1999) for the drilling fluid after it is removed from the cuttings at the shale shaker. Monitoring using the GCMS method on the stock drilling fluid is proposed to be required once, before it is used to drill a well. Formation oil monitoring using Reverse Phase Extraction is proposed to be required once per week when drill cuttings are being discharged.

The percent of drilling fluid retained on drill cuttings is also proposed to be limited based on the proposed Effluent Limitations Guidelines. This limit is intended to promote better separation of drilling fluid from cuttings and thereby limit the amount of drilling fluid discharged. As proposed, the permit will require monitoring with the retort test method which is described in Appendix 7 of the proposed guidelines.

IV. Water Quality Based Limitations

Ocean Discharge Criteria (CWA section 403(c)) as promulgated at 40 CFR Part 125 Subpart M prohibit issuance of an NPDES permit for discharge into the territorial seas, waters of the contiguous zone, or oceans unless the discharge will not cause unreasonable degradation of the marine environment after application of any necessary conditions.

The newly proposed limits and monitoring requirements will help to ensure that discharges of drill cuttings generated using non-aqueous drilling fluids do not cause unreasonable degradation of the marine environment. The discharge of toxic pollutants will be minimized through implementation of the proposed limitations for drilling fluids retention on cuttings, sediment toxicity, and polynuclear aromatic hydrocarbons and through the discharge prohibition of free oil, formation oil, and the bulk discharge of non-aqueous drilling fluids. Also, the proposed limit for biodegradation will help to reduced long term effects of discharges of drill cuttings generated using non-aqueous drilling fluids. The volume of cuttings generated using non-aqueous drilling fluids is generally thought to be less than when using water based drilling fluids. Based on the proposed limitations and available information concerning the characteristics of cuttings generated using non-aqueous drilling fluids, EPA has determined that authorization of this new discharge will not result in irreparable harm to the marine environment.

There is not, however, presently enough information to determine that the discharges will not cause unreasonable degradation of the marine environment. Although the proposed permit contains fairly extensive limits which will help to ensure compliance with Ocean Discharge Criteria, the long term effects of the discharges on the seafloor are not well understood. Ocean

Discharge Criteria at 40 CFR Part 125, Subpart M allow issuance of a permit, when there is insufficient information to determine that the discharge will not cause unreasonable degradation of the marine environment. In that case, the permit must require a monitoring program which will provide sufficient information to make that determination in the future. EPA Region 6 previously required such a monitoring program under the expired OCS general permit. That monitoring program required operators to conduct fish tissue sampling in order to determine potential bioaccumulative effects of produced water discharges. As with bioaccumulation, the permit is now proposed to require operators to conduct seabed surveys to determine the effects of the newly proposed discharges.

The proposed monitoring program will require operators to monitor the extent of seafloor coverage by drill cuttings and the rate of seabed recovery at platforms where non-aqueous drilling fluids are used. Due to the highly variable effects resulting from different non-aqueous drilling fluids which are presently available, such an effort will be required at all leases where cuttings generated using non-aqueous drilling fluids are discharged. Information to be gathered will include; the area and depth of coverage by drill cuttings, toxicity of the cuttings deposited on the seafloor using a sediment toxicity test with the Leptocheirus plumulosus species, analysis of contaminants present, and analysis of the benthic populations. Sampling at the seafloor will be required both at the end of drilling operations and one year after drilling has ceased. In addition, sampling of the seafloor benthic populations and an analysis of contaminants will be required at a site which is located near the discharge but sufficiently far as to be unaffected by the discharge of drill cuttings or the associated drilling fluids.

Detailed monitoring of the discharge will also be required. That monitoring will include: the dates discharge takes place, the current patterns affecting the transport of the discharged cuttings, the volumes and types of drilling fluids retained on cuttings and discharged, the volume of cuttings discharged, and a chemical analysis of drilling fluids used at the facility.

As an alternative, the permit is proposed to allow operators to participate in an EPA approved industry-wide seabed study. Such a cooperative study, while being less onerous for individual operators who participate, will be required to provide more extensive information. The alternate industry-wide study will be required to gather information at a minimum of twelve platforms where cuttings generated using non-aqueous drilling fluids are discharged. The majority of those twelve will be required to be located in deep water (greater than 1,000 feet in depth). In addition, the seafloor at a minimum of two control platforms, one in deep water and one in shallow water, will be studied. At a minimum, monitoring at the deepwater locations is intended to determine: the areal extent and thickness of cuttings deposition, the sediment chemistry and mineralogy, the extent of anoxia effects resulting from cuttings discharges and biological surveys of the area. Sampling at shallow water locations will be required to include more extensive biological sampling intended to measure community structure changes relative to cuttings discharges, as well as the physical and chemical monitoring which will be preformed in deepwater. As with individual sampling, the industry-wide study will require collection of detailed information regarding drill cuttings discharges and the types of drilling fluids which are used.

As proposed, monitoring will be required to be initiated within two years after the effective date

of the permit. Operators electing to conduct an industry-wide study must submit a detailed plan for such a study to EPA for approval prior of commencement of the study. Approval and oversight of such a study will be conducted by EPA in conjunction with the Minerals Management Service.

V. Water Used to Pressure Test Existing Piping and Existing Pipelines

EPA is considering a new miscellaneous discharge of water used to pressure test existing piping and existing pipelines, which may fall under the category of: Miscellaneous Discharges of Seawater and Freshwater which have been chemically treated. Other discharges under that category were recently added to the permit during its partial reissuance which was published in the Federal Register on November 2, 1998 at 63 FR 58722. The same water quality and technology based limitations and monitoring requirements, which apply to the other miscellaneous discharges are thought appropriate for this new discharge. Those limits are for: concentration of the treatment chemical, free oil, and toxicity. The Agency believes, however, that more frequent monitoring for free oil may be appropriate for the new discharges. EPA requests information on the appropriateness of the existing limits for the new hydrostatic test water discharges and on the appropriate monitoring regime for free oil.

VI. REFERENCES

Effluent Limitations Guidelines and New Source Performance Standards for Synthetic-Based and Other Non-Aqueous Drilling Fluids in the Oil and Gas Extraction Point Source Category, 64 FR 5487, USEPA, February 3, 1999.

Final NPDES General Permit for the Western Gulf of Mexico Outer Continental Shelf (GMG290000), 57 FR 54642, USEPA, November 19, 1992.